Laparoscopic management of adrenal incidentaloma. A case report.

Carlos Tadeo Perzabal Avilez M.D.
Cesar Alberto Lopez Jaime M.D.
Saul Jasam Ruiz Cereceres M.D.
Anna Karina Soto Posada M.D.
Tanya Giselle Zapata Arredondo M.D.
Aldo Gustavo Acosta Garcia M.D.
Carlos Emiliano Perzabal De La Garza M.D.
Chihuahua, Mexico.

Case Report

General Surgery

OPEN ACCESS

BACKGROUND: The term "incidentaloma" was coined in 1982 by Geelhoed and Druy, as initially used to describe an incidentally discovered adrenal mass on imaging study ordered for conditions unrelated to any suspicion of adrenal disease.
This is a 68-year-old male who comes to the outpatient clinic for presenting pain in the left lumbar region of 6 months of oppressive evolution, without other added symptoms, a contrasted abdominal tomography study is performed, with evidence of little 1 cm left adrenal tumor, to which the patient decides to perform surgery to remove the tumor.
The patient went in the right lateral decubitus position, and thrue laparoscopic surgery the left Told fascia was release with ligasure, the splenocolic ligament was released, the spleen is separated from the kidney, and the upper pole of the kidney and adrenal gland are identified as well as perirenal fat which is proceed to resect in its entirety.
The major clinical concern in adrenal incidentaloma is the risk of malignancy and hormone overproduction, but most adrenal masses are non-functional benign cortical adenomas that require no treatment. Many incidentaloma, while picked up incidentally, may have clinical symptoms or associated signs on closer questioning and clinical examination.
Adrenal tumors are usually imaging findings due to the widespread use of imaging studies at present, and currently the transabdominal laparoscopic surgery is an excellent therapeutic option with a low rate of complications and satisfactory postoperative results.

KEY WORDS: Adrenal adenoma; adrenal computed tomography; adrenal incidentaloma; laparoscopic adrenalectomy

Introduction

The adrenal incidentaloma (AI) is a serendipitously discovered adrenal lesion greater than 1 cm in diameter on radiologic examination performed for other reasons than to investigate for primary adrenal disease, is excluded in patients with known malignancy or high suspicion of malignant processes or during the screening of patients with hereditary syndromes or extra-adrenal tumors, also in patients with clinically evident adrenal disease or overt disease originally missed due to insufficient clinical examination according to the European Society of Endocrinology and European Network for the Study of Adrenal Tumors (ESE/ ENSAT). (1-3) The term "incidentaloma" was coined in 1982 by Geelhoed and Druy, as initially used to describe an incidentally discovered adrenal mass on imaging study ordered for conditions unrelated to any suspicion of adrenal disease (3, 5).

Case report

This is a 68-year-old male who comes to the outpatient clinic for presenting pain in the left lumbar region of 6 months of oppressive evolution, without other added symptoms, for which a contrasted abdominal tomography study is performed, with evidence of little 1 cm left adrenal tumor,(Figure 1) without evidence of any other intra-abdominal lesion, preoperative studies and hormonal profile are performed, without alterations, for which close monitoring is proposed to the patient based on serial imaging studies, to which the patient prefers the perform surgery to remove the tumor.

The patient went under general anesthesia in the right lateral decubitus position, a pneumoperitoneum was performed at 15 mmHg with a veress needle using the Palmer technique, a 12mm trocar was inserted in the left paraumbilical region, the rest of the ports were inserted under direct vision, left Told fascia was release with ligasure (Figure 2A), until entering the retroperitoneum and releasing the splenocolic ligament (Figure 2B), later the spleen is

From the Division of General surgery and Laparoscopy at Hospital General de Ciudad Juarez, Chihuahua, Mexico. Received on January 10, 2022. Accepted on January 19, 2022. Published on January 21, 2022.

DOI 10.17605/OSF.IO/2XZVK

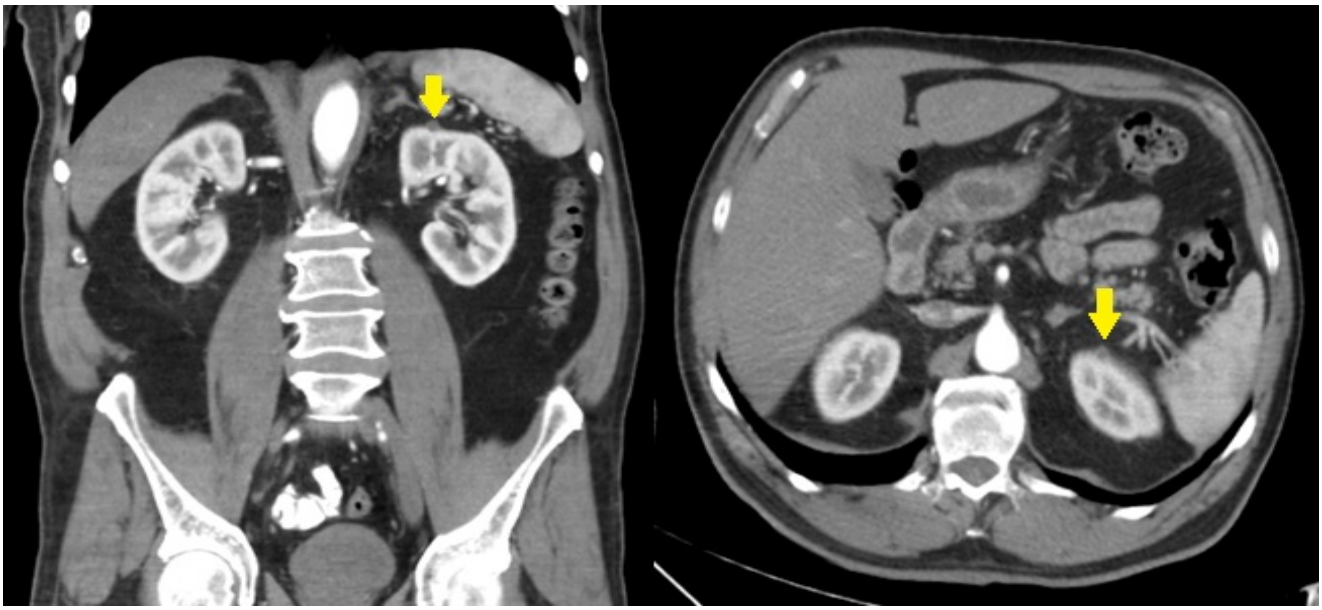

Figure 1. Abdominal tomography with IV contrast. The coronal section tomography on the left with a small, well-defined circular tumor that does not enhance the contrast found in the left adrenal region, the axial section tomography on the right, the same image of approximately 1x 1 cm is observed again.

separated from the kidney without injuring the splenic vessels (Figure 2C), the upper pole of the kidney and adrenal gland are identified as well as perirenal fat (Figure 2D), which is proceed to resect in its entirety, until the adrenal vessels are identified which are cut with ligasure (Figure 2E), the adrenal gland is resected in its entirety (Figure 2F), to later introduce it in an endoscopic bag (Figure 2G) to be able to extract it through the laparoscopic port (Figure 2H), a penrose is placed by counter-opening, and the procedure is considered completed, the surgical piece is sent to the histapathology study (Figure 3) and the patient is discharged to his home at 24 hour, with satisfactory evolution. In the postoperative follow-up the histopathology results, with evidence of adrenal adenoma.

Discussion

The major clinical concern in adrenal incidentaloma is the risk of malignancy and hormone overproduction, but most adrenal masses are non-functional benign cortical adenomas that require no treatment. (4)

Although the Majority of AIs are unilateral, bilateral AIs may be found in 10% to 15% of cases (3). In bilateral masses, there is possibility of one mass will be a non-functional cortical adenoma and the other will be a hormone secreting mass, however, the most common causes of bilateral AI were metastasis, primary bilateral macronodular adrenal hyperplasia and bilateral cortical adenomas. (3, 7)

The prevalence of Adrenal incidentaloma (AI) varies depending on the source of data; autopsy, surgery, or radiology series, has been reported as high as 8% in autopsy series and 4% in radiologic series (1, 4). The prevalence increases with age, and it often accompanies obesity, diabetes mellitus or hypertension (2). With advances in imaging technology, it been observed until 4% in middle age and up to 10% in the elderly (2), non-functional benign adenoma is found in 80% of adrenal incidentaloma cases. (2) The frequency of primary adrenal carcinoma is approximately 2–5% and non-adrenal metastases to the adrenal gland accounts about 0.7 - 2.5 % (7). Functional adrenal tumors are hyperfunctioning adrenal lesions and there are three conditions where adrenal hyperfunctioning should be considered: pheochromocytoma, primary aldosteronism and subclinical Cushing's syndrome (7).

Mantero et al. revealed a series of 1004 adrenal incidentalomas, where them found a 85 percent were nonfunctional, 9.2 percent were found to secrete low levels of cortisol, 4.2 percent were pheochromocytomas, and 1.6 percent were aldosteronomas. (10)

Many incidentaloma, while picked up incidentally, may have clinical symptoms or associated signs on closer questioning and clinical examination, sometimes where adrenal mass is large (causing local pressure effect) or the tumor demonstrates clinically significant hormone hypersecretion, specific clinical features may be uncovered. However, it is important to note that even functional tumors may not result in significant clinical symptoms. (3) Imaging characteristics cannot reliably distinguish between functional and nonfunctional tumors. As such, all patients with an AI should be systematically assessed for functional activity by endocrine biochemical testing, regardless of the

DOI 10.17605/OSF.IO/2XZVK

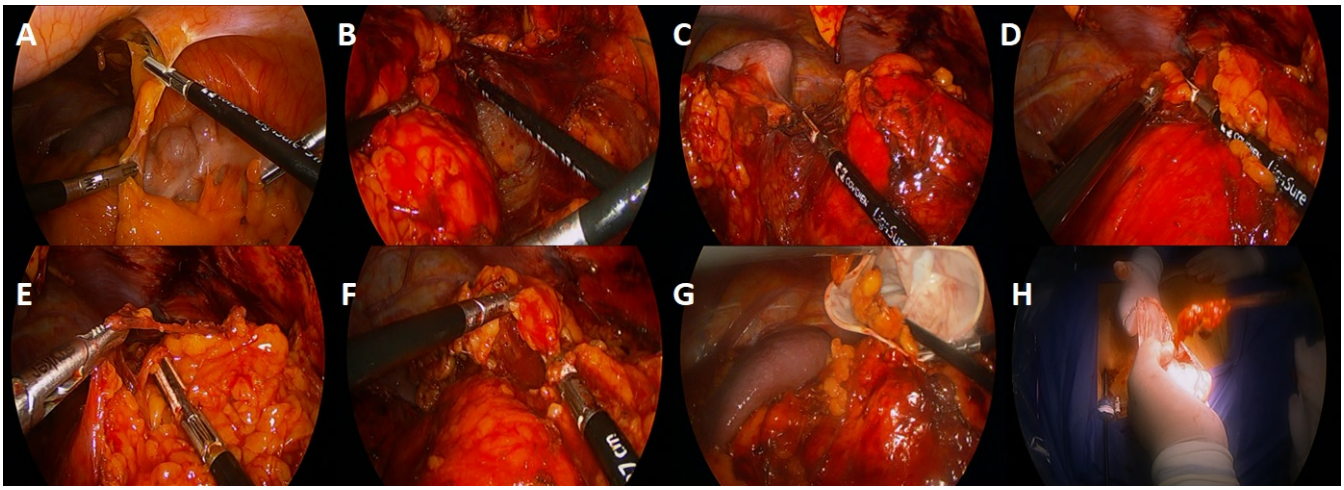

Figure 2. A. Left Told fascia was release with ligasure. B. Dissection of the retroperitoneum and release of the splenocolic ligament. C. The spleen is separated from the kidney without injuring the splenic vessels. D. The upper pole of the kidney and adrenal gland are identified as well as perirenal fat. E. The adrenal vessels are identified which are cut with ligasure. F. The adrenal gland is resected in its entirety. G. The adrenal gland is introduce in an endoscopic bag. H. Extraction of the adrenal gland through the port inside the endoscopic bag.

presence or absence of symptoms. (3). Most of the times, pheochromocytomas are diagnosed in presymtomatic stage due to widespread use of computed imaging and rest are diagnosed after evaluation of pheochromocytoma-related symptoms. Primary aldosteronism should be considered if the patient is hypertensive or has hypokalemia. All patients with hypertension and an adrenal incidentaloma should be evaluated by measurements of plasma aldosterone concentration and plasma renin activity. Normotensive patients with spontaneous hypokalemia should also be considered for testing for primary aldosteronism. Subclinical Cushing's syndrome is a cortisol secretion without clinical manifestations of Cushing's syndrome and its detection is more common with adrenal incidentaloma. (7).

Diagnostic procedures for adrenal incidentalomas start with laboratory evaluation to assess for hormone excess. As a general principle, every patient with Adrenal Incidentaloma should be screened cortisol excess, pheochromocytoma, and in those patients with hypertension, primary hyperaldosteronism (3,12). One approach used by endocrinologists is to obtain a dexamethasone suppression test and plasma metanephrines in all patients with incidentally discovered adrenal masses. If the plasma metanephrines are equivocal, 24-hour urine collection can be performed for metanephrines. If the patient is found to be hypertensive, serum renin and aldosterone levels may be performed to exclude an aldosteronoma, recent data has suggested this may not need to be the case in low Hounsfield unit lesions and glucocorticoid excess. (3, 8).

Radiographic imaging is the cornerstone in evaluating the nature of adrenal masses. The specific characteristic of adrenal lesions on radiographic imaging helps in determining whether its benign or malignant lesion (7). The size of the adrenal lesion is an important factor as the maximum diameter of the lesion is predictive of malignancy. It been proposed a correlation between tumor size and risk of adrenocortical cancer: 2% risk in incidentaloma <4 cm, 6% in 4.1 to 6 cm and 25% in >6 cm. The smaller the size of the adrenocortical carcinoma, the better the overall prognosis. (3, 7).

Other imaging features used for characterization include unenhanced CT with the assessment of tumor density, contrast-enhanced timed washout CT studies, MRI chemical shift analysis, and, more recently, 18-fluorodeoxyglucose (FDG) positron emission tomography (FDG-PET) in combination with CT (PET-CT) (3)

A noncontrast CT is recommended as the first-line investigation. HU assessment on an unenhanced CT is a method for quantifying X-ray absorption of tissues compared with water, which conventionally has a HU of 0. An HU of ≤10 on a noncontrast CT is consistent with a lipid-rich benign adenoma. Approximately 30% of benign adrenal adenomas do not contain large amounts of fat and have an attenuation value of >10 HU, for this lesions further assessment is required and there is no clear consensuss regarding which is the best second-line imaging for these patients. Sherlokk, et al. proposed a n adrenal washout protocol CT as the next test because this is more accurate for characterizing lipid-poor adenomas than MRI. (3, 5)

DOI 10.17605/OSF.IO/2XZVK

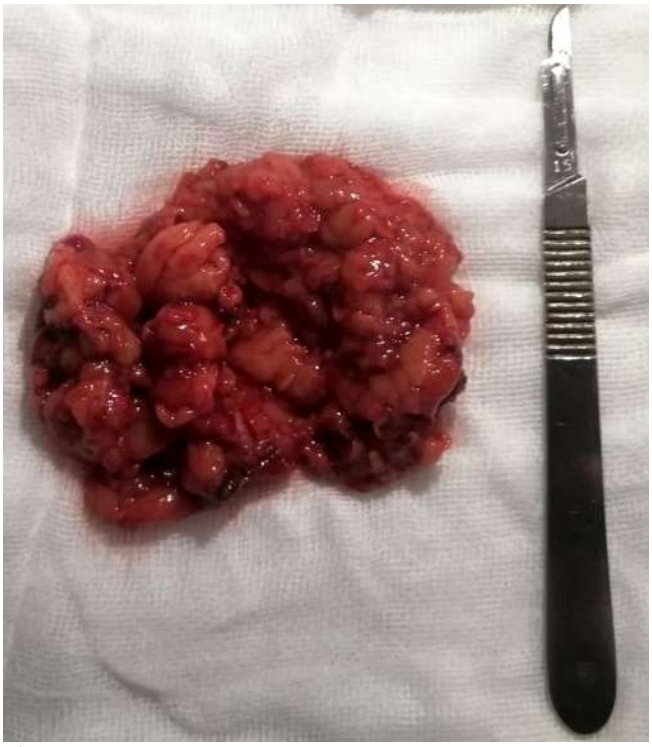

Figure 3: The image shows the surgical specimen resulting from a left adrenalectomy with perirenal fat.

Washout studies consist of CT imaging performed before and at 2 time points after administration of intravenous contrast (typically imaging is performed at 60-90 seconds and 10 or 15 minutes postcontrast). (3). Adenomas typically enhance rapidly and show prompt washout of intravenous contrast, in contrast to malignant adrenal lesions which usually enhance rapidly but demonstrate a slower washout of contrast medium. Absolute washout values of >60% suggests a benign adenoma. (3)

MRI is useful, particularly to differentiate lipid poor adenomas after CT scan, considering the change in intensity between in- and out-of-phase sequences. Nuclear medicine is emerging as a helpful diagnostic tooling patients with AI, Positron Emission Tomography (PET) presents 92–100% sensitivity and 80–100% specificity in the differentiation of benign and malignant adrenal lesions. (6).

Adrenal biopsy with a fine-needle aspiration is controversial, may be considered in the context of known primary malignance elsewhere with a newly discovered adrenal mass or when the mass is proven to be hormonally inactive, indeterminate on imaging, and the management of the patient would be altered by the histology results. (12).

Risks of adrenal biopsy include hematoma, pancreatitis, abdominal pain, pneumothorax, hematuria, abscess formation, and seeding of tumor cells along the needle track. (12).

Adrenal lesion with suspicious picture on imaging or size greater than 4cm in diameter should be offered surgery as substantial fraction will be adrenocortical carcinomas. The decision should be taken depending on the clinical scenario, patient's age and functional status of the tumor. Conservative treatment with follow up imaging can be offered to elderly patients with adrenal incidentaloma, but young patients need a careful and prompt attention. (7)

Since the first description of a laparoscopic adrenalectomy by Michel Gagner in 1992, laparoscopic adrenalectomy has quickly become the standard of care for removing most adrenal masses [1,11]. Multiple prospective and retrospective studies have demonstrated minimal morbidity, short convalescence, and excellent aesthetic results with laparoscopic adrenalectomy. These results apply to functional and nonfunctional tumors (11). Appropriate medical perioperative management is imperative to ensure patient safety.

Masses highly suspicious for Adrenocortical Carcinoma should be referred for open adrenalectomy. Other unilateral adrenal masses with indeterminate findings on imaging or size >4 cm should be offered surgical intervention. Surgical approach for these may be laparoscopic or open, depending on the individual patient factors. (12).

Follow-up of adrenal incidentalomas is dependent on the characteristics of the original lesion. Current guidelines agree that patients with benign lesions that are non-functional can be followed with repeat imaging at 6 to 12 months to reevaluate for interval size increase or development of suspicious features. (12)

Conclusion

Adrenal tumors are usually imaging findings due to the widespread use of imaging studies at present, however their clinical presentation is usually vague, and malignancy, although rare, is usually a constant concern for the patient, for which many patients choose to perform surgery instead of surveillance with imaging studies; Currently, transabdominal laparoscopic surgery is an excellent therapeutic option with a low rate of complications and satisfactory postoperative results.

Conflicts of interests

The authors have no conflicts of interest to declare.

Acknowledgements

We thank the staff of the "Centro Medico de Especialidades" for their support and constant drive to learn.

References

1. Kapoor, A., Morris, T., & Rebello, R. (2011). Guidelines for the management of the incidentally discovered adrenal mass. Journal de l'Association Des Urologues Du Canada [Canadian Urological Association Journal], 5(4), 241–247
2. Lee, J. M., Kim, M. K., Ko, S. H., Koh, J. M., Kim, B. Y., Kim, S. W., Kim, S. K., Kim, H. J., Ryu, O. H., Park, J., Lim, J. S., Kim, S. Y., Shong, Y. K., Yoo, S. J., & Korean Endocrine Society, Committee for Clinical Practice Guidelines. (2017). Clinical guidelines for the management of adrenal incidentaloma. Endocrinology and Metabolism (Seoul, Korea), 32(2), 200–218.
3. Sherlock, M., Scarsbrook, A., Abbas, A., Fraser, S., Limumpornpetch, P., Dineen, R., & Stewart, P. M. (2020). Adrenal incidentaloma. Endocrine Reviews, 41(6), 775–820.
4. Kastelan, D., Kraljevic, I., Dusek, T., Knezevic, N., Solak, M., Gardijan, B., Kralik, M., Poljicanin, T., Skoric-Polovina, T., & Kastelan, Z. (2015). The clinical course of patients with adrenal incidentaloma: is it time to reconsider the current recommendations? European Journal of Endocrinology, 173(2), 275–282.
5. Patrova, J., Jarocka, I., Wahrenberg, H., & Falhammar, H. (2015). Clinical outcomes in adrenal incidentaloma: Experience from one center. Endocrine Practice: Official Journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists, 21(8), 870–877.
6. Voltan, G., Boscaro, M., Armanini, D., Scaroni, C., & Ceccato, F. (2021). A multidisciplinary approach to the management of adrenal incidentaloma. Expert Review of Endocrinology & Metabolism, 16(4), 201–212.
7. Kadam SS, Adrenal Incidentaloma: A Brief Review. Clin Onco. 2021; 4(5): 1-4
8. Mayo-Smith, W. W., Song, J. H., Boland, G. L., Francis, I. R., Israel, G. M., Mazzaglia, P. J., Berland, L. L., & Pandharipande, P. V. (2017). Management of incidental adrenal masses: A white paper of the ACR incidental findings committee. Journal of the American College of Radiology: JACR, 14(8), 1038–1044.
9. Hanna, F. W. F., Issa, B. G., Sim, J., Keevil, B., & Fryer, A. A. (2018). Management of incidental adrenal tumours. BMJ (Clinical Research Ed.), 360, j5674.
10. Mantero, F., Terzolo, M., Arnaldi, G., Osella, G., Masini, A. M., Alì, A., Giovagnetti, M., Opocher, G., & Angeli, A. (2000). A survey on adrenal incidentaloma in Italy. Study Group on Adrenal Tumors of the Italian Society of Endocrinology. The Journal of Clinical Endocrinology and Metabolism, 85(2), 637–644.
11. Stefanidis, D., Goldfarb, M., Kercher, K. W., Hope, W. W., Richardson, W., Fanelli, R. D., & Society of Gastrointestinal and Endoscopic Surgeons. (2013). SAGES guidelines for minimally invasive treatment of adrenal pathology. Surgical Endoscopy, 27(11), 3960–3980.
12. Jason, D. S., & Oltmann, S. C. (2019). Evaluation of an adrenal incidentaloma. The Surgical Clinics of North America, 99(4), 721–729.

Cesar Alberto Lopez Jaime
Division of General surgery / Laparoscopy
Hospital General de Ciudad Juarez
Chihuahua, Mexico
cesarlopezj91@gmail.com

DOI 10.17605/OSF.IO/2XZVK